

### Claims

1. (Previously Presented) A method of constructing a model operable to generate one or more job performance criteria predictions based on input pre-hire information, the method comprising:

electronically collecting pre-hire information from a plurality of applicants wherein at least some of the pre-hire information is collected from at least one of the applicants who responds directly on an electronic device to provide pre-hire applicant responses to questions;

collecting post-hire information for the applicants based on job performance of the applicants after hire;

via information-theoretic feature selection, choosing questions from the pre-hire information as features for which respective pre-hire applicant responses serve as inputs to the model, wherein the information-theoretic feature selection comprises identifying at least one higher-order interaction comprising a set of a plurality of questions having higher predictive power than a sum of predictive powers of individual questions in the set, wherein the higher-order interaction exhibits a synergy between the set of the plurality of questions having higher predictive power;

from the pre-hire information and the post-hire information, training an artificial intelligence-based predictive model in a computer-readable medium with observed pre-hire applicant responses for the chosen features, wherein the artificial intelligence-based predictive model is operable to generate one or more job performance criteria predictions based at least on input pre-hire information from new applicants corresponding to the chosen features, whereby the one or more job performance criteria predictions are usable as a basis for a hiring recommendation or other employee selection information;

deploying the model, wherein deploying comprises converting the model into command code and providing an operational applicant processing system; and

conducting performance tuning for the model, wherein performance tuning comprises continuing data collection, monitoring sample size as incoming data accumulates, and repeating feature selection.

2. (Previously Presented) A computer-readable medium comprising computer-executable instructions for performing a method of constructing a model operable to generate one or more job performance criteria predictions based on input pre-hire information, the method comprising:

electronically collecting pre-hire information from a plurality of applicants wherein at least some of the pre-hire information is collected from at least one of the applicants who responds directly on an electronic device to provide pre-hire applicant responses to questions;

collecting post-hire information for the applicants based on job performance of the applicants after hire;

via information-theoretic feature selection, choosing questions from the pre-hire information as features for which respective pre-hire applicant responses serve as inputs to the model, wherein the information-theoretic feature selection comprises identifying at least one higher-order interaction comprising a set of a plurality of questions having higher predictive power than a sum of predictive powers of individual questions in the set, wherein the higher-order interaction exhibits a synergy between the set of the plurality of questions having higher predictive power;

from the pre-hire information and the post-hire information, training an artificial intelligence-based predictive model with observed pre-hire applicant responses for the chosen features, wherein the artificial intelligence-based predictive model is operable to generate one or more job performance criteria predictions based at least on input pre-hire information from new applicants corresponding to the chosen features;

deploying the model, wherein deploying comprises converting the model into command code and providing an operational applicant processing system; and

conducting performance tuning for the model, wherein performance tuning comprises continuing data collection, monitoring sample size as incoming data accumulates, and repeating feature selection.

3-4. (Canceled)

5. (Original) The method of claim 1 further comprising:

limiting the applicants for the model to those with a particular occupation; and  
constructing the model as an occupationally-specialized model.

6. (Original) The method of claim 1 wherein the model accepts one or more inputs, the method further comprising:

identifying in the pre-hire information one or more characteristics that are ineffective predictors; and

omitting the ineffective predictors as inputs to the model.

7. (Original) The method of claim 1 wherein the pre-hire information comprises one or more characteristics, the method further comprising:

identifying in the pre-hire information one or more characteristics that are ineffective predictors; and

providing an indication that the characteristics no longer need to be collected.

8. (Previously Presented) The method of claim 1 wherein job performance criteria predictions comprise a prediction indicating whether a job candidate will be voluntarily terminated.

9. (Previously Presented) The method of claim 1 wherein job performance criteria predictions comprise a prediction indicating whether a job candidate will be eligible for rehire after termination.

10. (Previously Presented) The method of claim 1 wherein the pre-hire information comprises one or more characteristics, the method further comprising:

identifying in the pre-hire information one or more characteristics that are ineffective predictors;

responsive to identifying the ineffective predictors, collecting new pre-hire information not including the ineffective predictors; and

building a refined model based on the new pre-hire information.

11. (Original) The method of claim 10 further comprising:  
adding one or more new characteristics to be collected when collecting the new pre-hire information.
12. (Original) The method of claim 11 further comprising:  
evaluating the effectiveness of the new characteristics.
- 13-51. (Canceled)
52. (New) The method of claim 53 wherein collecting post-hire information further comprises:  
tracking whether the applicant has been dropped from payroll.
53. (New) The method of claim 1 wherein:  
collecting post-hire information comprises receiving payroll information for the applicants via a network, determining a termination date for an applicant from the payroll information received via the network, and determining tenure of the applicant by comparing the termination date with a hiring date of the applicant.
54. (New) The method of claim 1 wherein:  
the set of the plurality of questions having higher predictive power than the sum of predictive powers of individual questions in the set comprises at least one biodata question and at least one psychometric question.

55. (New) The method of claim 1 wherein identifying at least one higher-order interaction comprises:

generating an approximation of an optimal subset of questions for use as input features for the model.

56. (New) The method of claim 55 wherein generating an approximation of an optimal subset of questions comprises:

determining a union of a set of questions appearing in predictive transmissions of greatest magnitude.

57. (New) The method of claim 55 wherein generating an approximation of an optimal subset of questions comprises:

from a set of transmissions  $T_k$ , choosing  $m$  unique transmissions of greatest magnitude as a base set for higher-order transmissions;

generating  $T'_{k+1}$ , by adding questions to members of  $T_k$ , that generate a set  $T'_{k+1}$  with largest transmission values; and

taking a union of questions appearing in the unique transmissions of greatest magnitude, wherein the union approximates the optimal subset of questions.

58. (New) One or more computer-readable storage media having stored thereon an executable model operable to generate one or more job performance criteria predictions based on input pre-hire information, the model constructed via a method comprising:

electronically collecting pre-hire information from a plurality of applicants wherein at least some of the pre-hire information is collected from at least one of the applicants who responds directly on an electronic device to provide pre-hire applicant responses to questions;

collecting post-hire information for the applicants based on job performance of the applicants after hire;

via information-theoretic feature selection, choosing questions from the pre-hire information as features for which respective pre-hire applicant responses serve as inputs to the model, wherein the information-theoretic feature selection comprises identifying at least one higher-order interaction comprising a set of a plurality of questions having higher predictive power than a sum of predictive powers of individual questions in the set, wherein the higher-order interaction exhibits a synergy between the set of the plurality of questions having higher predictive power;

from the pre-hire information and the post-hire information, training an artificial intelligence-based predictive model in a computer-readable medium with observed pre-hire applicant responses for the chosen features, wherein the artificial intelligence-based predictive model is operable to generate one or more job performance criteria predictions based at least on input pre-hire information from new applicants corresponding to the chosen features, whereby the one or more job performance criteria predictions are usable as a basis for a hiring recommendation or other employee selection information;

deploying the model, wherein deploying comprises converting the model into command code and providing an operational applicant processing system; and

conducting performance tuning for the model, wherein performance tuning comprises continuing data collection, monitoring sample size as incoming data accumulates, and repeating feature selection.